TWO YEAR WARRANTY

REDARC Electronics warrants to the original purchaser that the product(s) on the reverse side of this sheet ("Product") will be free, under normal use and maintenance, from defects in material and workmanship for a period of TWO YEARS from the date of purchase, subject to the conditions shown below.

1. **Warranty**

   Unless otherwise stated in this warranty, Redarc Electronics will at its sole discretion either replace or repair any of the Product that is defective in material or workmanship within the abovementioned period without charge to the original purchaser.

2. Other Warranty

   Subject to any terms implied by law, this warranty contains the whole of the Redarc Electronics' obligations and any distributor and the agents, officers and employees of such distributor and of Redarc Electronics are not authorised to vary or extend the terms of the warranty. The benefits conferred by this warranty are in addition to the conditions and warranties implied by applicable legislation conferring rights upon consumers, which apply only to the extent to which they may not by law be excluded.

3. Exclusions

   This warranty shall not apply to, or include, any of the following:

   3.1 Any defect or failure due to accident, misuse, abuse, movement of the Product to a new site, negligence, non-observance of any of the instructions supplied with the Product including the instructions on the reverse side of this sheet ("Operating Instructions") or local regulations on the part of any user, choice of location, improper installation, configuration or connection, or faulty power supply.

   3.2 If the Product is installed, repaired or serviced by a person who is not a qualified auto electrician or electronics technician, or if non-approved parts have been fitted.

   3.3 Failure to obtain proper maintenance for the Product or any associated equipment or machinery.

   3.4 Failure to pay for the products in full or comply with Redarc Electronics' Trading Terms.

   3.5 If the Product is used other than for any reasonable purpose for which it was manufactured, or is used in a way not specified by Redarc Electronics.

   3.6 If the original purchaser sells, leases or otherwise parts with possession of the Product.

   3.7 Deterioration due to normal use and exposure, including abnormal environmental conditions such as lightning strike, flood and extreme heat.

   3.8 Any freight, packing and insurance expenses relating to transportation of the Product.

   3.9 Any expenses relating to installation and/or removal of the Product.

   3.10 Any damage, indirect or incidental, of whatever nature.

4. Limitations

   4.1 Redarc Electronics is not liable for any consequential, indirect or accidental loss or damage or for any service not expressly provided herein (including without limitation liability for any loss or damage caused by a fault in the Product or its external wiring connections) and the liability of Redarc Electronics under this warranty is limited to the repair or replacement of defective material or workmanship by a qualified auto electrician or electronics technician, provided such person and work is approved by Redarc prior to commencement. Subject to **clause 2**, Redarc Electronics is hereby excluded to the maximum extent permitted by law from all other liability in respect of the Product.

   4.2 While Redarc Electronics warrants, where applicable, that the Product is free from defects in materials and workmanship under normal use at the time of delivery, Redarc Electronics does not warrant that the Product will meet any user specific requirements or that the operation of the Product will be uninterrupted or error-free.

5. Owner's Responsibilities

   5.1 Maintenance of the Product and associated equipment and/or machinery is the responsibility of the owner. The owner must retain evidence that proper maintenance has been performed on the Product by Redarc Electronics or a qualified auto electrician or electronics technician. Claims made during the warranty term will not be accepted if resulting from lack of maintenance rather than faulty material or workmanship.

   5.2 The owner must operate the Product in accordance with all of the Operating Instructions.

   5.3 Upon discovery of a fault the owner must return the Product to the distributor with full details of the nature of the fault. Removal of the Product must be done by a qualified auto electrician or electronics technician to ensure that the warranty remains valid. A written report describing the circumstances of failure must accompany the returned Product with proof of purchase which clearly shows the date of such purchase by the original purchaser.

   5.4 If the Product is found to be working satisfactorily on return to Redarc Electronics a reasonable charge will be made for the cost of testing, packing and freight. The Product will be returned on receipt of the amount charged.

FREE TECHNICAL ASSISTANCE
REDARC
THE POWER CONVERSION SPECIALISTS
23 Brodie Road North
Lonsdale
South Australia 5160
Phone: 08 8322 4848
Fax: 08 8387 2889
Email: power@redarc.com.au
Web: www.redarc.com.au

Environmental System™ Certified Environmental Management CEM 20649 ISO 14001:2004 SAI Global

Quality System™ Quality Endorsed Company QEC 5375 ISO 9001:2000 SAI Global

REDARC The Specialists in Power Conversion

SBC1205

SMART BATTERY CHARGER

12 Volt DC – 5 Amp

Suitable for charging Calcium, AGM, Gel or Standard Lead Acid batteries

A charger for calcium content batteries which works!

Operating Instructions & Owners Manual

C-Tick N3533

ELECTRICAL SAFETY APPROVAL NUMBER : Q041193

FREE TECHNICAL ASSISTANCE, contact Redarc Electronics
Ph (08) 8322 4848, Fax (08) 8387 2889
or Email power@redarc.com.au
Specifications are subject to change without notification.

The REDARC **SMART BATTERY CHARGER (SBC)** is a "set and forget" four stage charger that automatically brings and maintains 100% charge to Lead Acid and Calcium content batteries. Being a Smart battery charger, it is controlled by a microprocessor, which is constantly checking the charging process. A battery will last longer and charge faster when charged using the Four Stage process.

WARNINGS

For safe operation, please ensure compliance to the following points.

- If the power cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid hazard.
- The charger is designed to charge batteries constructed with 6 cells only.
- The charger must only be plugged into an earthed mains socket outlet.
- For in-vehicle charging,
  1. The battery charger must be connected first to the battery terminal which is not connected to the vehicle chassis. The other connection is to be made to the chassis, remote from the battery and fuel line. The battery charger is then to be connected to the supply mains.
  2. After charging, disconnect the battery charger from supply mains. Then remove the chassis connection and the battery connection, in this order.
- The appliance is not intended for use by young children or infirm persons without supervision.
- Young children should be supervised to ensure that they do not play with the appliance.
- This appliance is not intended for permanent mounting into a vehicle.

KEY FEATURES

- Charges Standard, Calcium, AGM or Gel Lead Acid batteries (User Selectable via push button switch)
- Reverse polarity connection protection, charging commences after the battery has been connected correctly
- Output short circuit protection
- Battery overcharge protection
- Faulty battery cell detection and safe charge termination
- 4-Stage Charging Pattern with timeout protection
- Initial self test on power up
- Over temperature shut down
- Latest switch mode design
- Designed and manufactured in Australia for Australian conditions
- Safety and EMC compliance
- Light and ultra compact
- Recharges batteries to 100% capacity

REDARC The Specialists in Power Conversion

6.0 CHARGING TIME AND BATTERY CAPACITY

The charging time is dependant on a number of conditions including the ambient temperature and the general condition or age of the battery. However it is primarily dependant on how many Amp-Hours need to be put back into the battery to restore full charge, rather than the battery capacity itself. For example, a 50% discharged 45Ah battery requires 22.5Ah to be restored, while a 50% discharged 70Ah battery requires 35Ah to be restored. (Note: Due to inefficiencies in the battery, approximately 10% more is required to be delivered by the charger in practice). Based on the wide variety of conditions, the charger can be expected to restore approximately between 1 and 3 Amp-Hours per hour of charge.

To determine if a charger is too big for your battery, use the rule of thumb that the maximum battery charge current should be typically between 10% and 20% of the battery Amp-Hour rating. i.e. for a 50Ah battery, the typical maximum charging current should be less than 20% of 50Ah = 10A.

As a safety precaution, the maximum charge time has been limited to 25 hours. Please refer to "Ready indicator (Green) Flashing" in section 3.1 for a description of what happens if the charge cycle does time out.

7.0 WARNING: IN CAR CHARGING

In the Calcium battery selection mode the charger can achieve a maximum voltage of 16.5V, the following precautions should be taken:

- Vehicle ignition must be OFF
- Vehicle lights must be OFF
- Accessories must be OFF. This includes mobile telephones, radios and sound systems, DVD players and any other non ignition activated accessories installed.
- Be sure any caravans or boats connected to the vehicle, where the battery is being charged also have all their electrical systems turned off. A good precaution is to disconnect the trailer / caravan plug from the towed vehicle.

Most new vehicles can tolerate this voltage without damage to the vehicle electrical system. To ensure that your electrical system will tolerate this maximum charging voltage, please contact your vehicle service centre.

8.0 SPECIFICATIONS

ELECTRICAL:

AC Input Voltage:	216- 265V AC
Frequency:	50 Hz
Input Fusing:	2A Slow Blow **
Output Fusing:	10A **
EMI/RFI:	AS/NZS CISPR14-1:2003
Safety:	AS/NZS 3108
Efficiency:	>79%
Nominal Output Voltage:	12V
Output Voltage Range:	12 - 16.5V
Output Current Range:	0 - 5A
Output Power:	80W
Output Ripple:	< 1% at full load

** Not user serviceable

PHYSICAL:

Dimensions:	165 x 140 x 60 mm
Weight:	1.55Kg
Storage Temperature:	-10°C to + 70°C
Operating Temperature:	-5°C to + 50°C

FOR FREE **TECHNICAL ASSISTANCE** - Ph: (08) 8322 4848 Fax: (08) 8387 2889 Email: power@redarc.com.au

5.0 SAFETY & PRECAUTIONS

- Ensure the correct battery type has been selected before charging begins
- Before connecting or disconnecting the SBC1205 to a battery, ensure that it is disconnected from the 240VAC supply.
- NOTE disconnecting the battery from the vehicle will cause some components in the vehicle to lose stored memory or information, such as time on your stereo.
- Ensure electrolyte levels in the battery to be charged are sufficient to cover the plates (if accessible).
- DO NOT attempt to charge NON RECHARGEABLE batteries.
- DO NOT use the charger to charge a battery near a naked flame. The gasses emitted by the battery whilst charging may ignite, causing a life threatening fire or explosion.
- Always wear eye protection if working close to a charging battery.
- Never smoke in the vicinity of a charging battery.
- Take care whilst handling a lead acid battery, as the electrolyte is acidic and may cause permanent damage to skin or clothing.
- The charger is designed to be used indoors and to be protected from the elements. Do not expose the battery charger to the weather, particularly rain or dampness.
- Provide adequate ventilation whilst charging lead-acid batteries. This will ensure the charger will work at maximum efficiency and that any gasses emitted from the battery are safely dissipated.
- Do not extend the 12V output cables supplied between the charger and the battery to be charged, otherwise efficiency of operation will be compromised. Ensure the output clamps are firmly attached to the battery poles.
- Incorrectly connecting the Positive (+ Red wire) and Negative (- Black wire) at the battery will switch off the battery charger to protect it's internal electronics. Output and consequent charging will only recommence when the (+) and (-) are correctly attached to the corresponding (+) and (-) poles on the battery.
- Do not obstruct the fan. Note that the fan will run continuously during the charging cycle.
- The SBC1205 contains hazardous voltages internally and contains no user serviceable parts. Return to supplier for any service needs.
- If the power cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid hazard.
- The charger is designed to charge batteries constructed with 6 cells only.
- The charger must only be plugged into an earthed mains socket outlet.
- For in-vehicle charging,
    1. The battery charger must be connected first to the battery terminal which is not connected to the vehicle chassis. The other connection is to be made to the chassis, remote from the battery and fuel line. The battery charger is then to be connected to the supply mains.
    2. After charging, disconnect the battery charger from supply mains. Then remove the chassis connection and the battery connection, in this order.
- The appliance is not intended for use by young children or infirm persons without supervision.
- Young children should be supervised to ensure that they do not play with the appliance.
- This appliance is not intended for permanent mounting onto a vehicle.

REDARC The Specialists in Power Conversion

1.0 INSTALLATION

The charger must be placed in a well ventilated position to allow air flow to cool the charger for greater charging efficiency. The charger is best placed on top of the air filter if charging the battery in the vehicle. If that is not possible then find a convenient safe place where the charger is secure and not likely to fall down. **NOTE:** Never place the charger on top of the battery.

Leave the vent caps closed as modern automotive batteries have a gas recombination design built into the cap to allow the retention of the gassed electrolyte and its return to the battery cell. All vent caps also have a venting system to allow excessive gasses to escape. Coin screwed cap designs also have a "manifold" venting system, which works in the same way as a screwed vent cap.

1.1 Connections

Ensure the connections are tight and sound. Then connect the 240VAC three pin plug to the power point and switch on the power. Then switch on the Smart Battery Charger power switch (located on the rear panel).

Once turned ON, the charger will pause momentarily, then light up all the indicators in a sequence so you can see that they are all functional. The cooling fan will also be run up and tested during this sequence.

2.0 SELECTING A BATTERY TYPE

You will have 60 seconds from the moment the charger is turned on to make the selection.

Using the **Battery Type Selector button**, select the battery type to be charged. The battery options are;

Flooded cell:

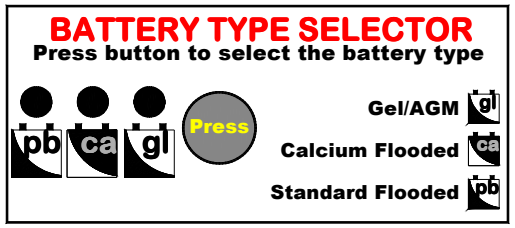
Standard Lead Acid

Calcium content Lead Acid

Non-flooded cell:

Gel/AGM

By default, a ***Gel/AGM*** battery type is selected *(Green Indicator ON)*.



During the selection period, the selected battery type LED will flash. Once 60 seconds has expired, the selection is locked in for the remainder of the charging period and the selected battery type LED will remain permanently illuminated. Should an incorrect battery be selected, the battery charger should be turned off for approximately 10 seconds, then turned back on. The correct battery selection can now be made.

When the Ready indicator (GREEN) is ON, the battery has finished charging.

If the Fault indicator (RED) is flashing, a fault has caused the charging process to terminate. The number of quick flashes, followed by a longer OFF period indicates the nature of the fault. The fault indication will be reset when the charger is switched OFF.

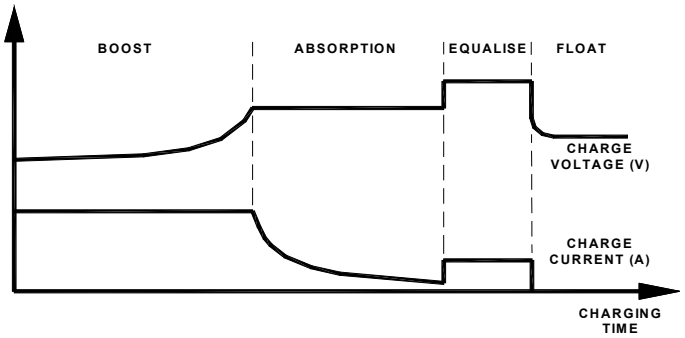
NOTE: For safety reasons, always switch OFF the battery charger before disconnecting the battery.

3.0 OPERATION

The SBC1205 has been designed to return a discharged battery to 100% charge through a rigorous charging cycle. This charging cycle assumes that no load is connected to the battery during charging, otherwise full charge may not be achieved. It is also possible that the charger may determine that the charging characteristics with a load applied appears like a fault and terminate the charging cycle. Small loads such as the loads drawn by vehicle electronics with the ignition turned off do not present a problem to normal operation. The charging cycle consists of a number of stages as described over the page, and when completed remains in a float mode indefinitely. It is safe to leave the battery connected to the charger as the float mode will not allow over charging whilst maintaining the battery to a fully charged state.

If the battery remains connected to the charger and a charge cycle completes, the charging cycle will not restart even if the battery becomes discharged by a load. Instead, the charger will continue in float mode. The full charge cycle can only be restarted by turning the charger off, waiting for approximately 10 seconds, then turning it back on again.

4-STAGE CHARGING PROCESS



3.1 Indicators

There are three visual indicators to assist the operator during the charging process, and these are described below.

Charging indicator (Orange)

This indicator is used during the first three stages of charging (Boost, Absorption and Equalise), and flashes at different rates to indicate the charging mode.

Boost Mode: *Orange indicator ON-single flash.* This mode delivers the bulk charge to the battery by delivering maximum constant current. This stage is time limited to cater for a fully discharged 40Ah battery, however the time taken in this mode does greatly depend on the condition and state of charge of the battery.

Absorption Mode: *Orange indicator ON-double flash.*

This mode must be finished before Equalise can take place. The charger maintains constant charging voltage, while the current reduces. This voltage is close to the gassing voltage of the electrolyte.

Equalise Mode: *Orange indicator ON – triple flash.*

This mode brings the battery to full charge. A higher voltage is applied to induce some gassing, which mixes the electrolyte, bringing the cells to equal potential. In a low maintenance battery, most of the hydrogen and oxygen gasses will recombine and will not dry out the battery.

Note that this mode is not run for Gel/AGM batteries.

REDARC The Specialists in Power Conversion

Ready indicator (Green) Continuously ON

Indicates that the battery charging process is complete, and full charge (100%) has been achieved. The charger is now in the maintenance mode (Float), where it will keep the battery at full charge indefinitely without the fear of overcharging. The battery is ready for use, and can be disconnected.

Ready indicator (Green) Flashing

Indicates that the battery capacity has exceeded the maximum charge time allowable in one charge cycle. The battery charging process has timed out, the charger is now in the maintenance mode (Float), where it will keep the battery at its current level of charge indefinitely. The charger can now be turned off and back on again to restart the charging cycle and hence achieve full charge.

4.0 TROUBLE SHOOTING

The Redarc SBC1205 is one of the most advanced chargers on the market. It has been designed to detect and advise the operator of a variety of fault conditions, and will terminate the charging cycle immediately a fault is detected. This ensures that the charger does not attempt to charge a faulty battery, which protects the charger, battery and most importantly the user.

4.1 Fault Detection LED (Red)

When faults are detected, the charger shuts down the charging process and displays the nature of the fault via a Red flashing LED. Possible faults are;

! ● Fault

Continuously on-Hardware failure detected:

The SBC1205 failed its self-test on power up. The unit should be returned to the supplier for inspection.

One Flash-Over current detected:

An excessive current will cause this fault. This will indicate a faulty battery if it occurs during a charging cycle, but not necessarily if it happens upon connection. This fault may also be triggered by trying to charge a lower voltage battery than specified e.g. 6V on a 12V charger.

Two Flashes-Voltage problem detected:

A battery that remains at a low voltage for too long or a battery which has a higher voltage than specified, will cause this fault e.g. attempting to charge a 24V battery on a 12V charger.

Three Flashes-Faulty battery detected:

Charging a battery with a dead cell will result in this fault. With some batteries it might take longer to detect the fault than in others, depending upon the initial level of charge and also how damaged the battery is. If the battery is badly damaged, the fault may show up as over current.

Four Flashes- Overheat:

The charger is too hot to operate, the charging process is suspended, and will recommence once the charger has cooled down. This can happen on a very hot day, if the charger is positioned in a very hot place while charging or if the ventilation holes have been blocked. Also, the fan may not be functioning properly.

4.2 Electrolyte (Not applicable for AGM/Gel battery types)

If the battery charger detects a fault it will shut down immediately. In this case, check if connections to the battery are tight. Is the battery sound? Check the electrolyte levels and use a Hydrometer to check for "dead" cells. A lead-acid battery is considered to be discharged when the specific gravity of the electrolyte is less than 1.16.

FOR FREE **TECHNICAL ASSISTANCE** - Ph: (08) 8322 4848 Fax: (08) 8387 2889 Email: power@redarc.com.au